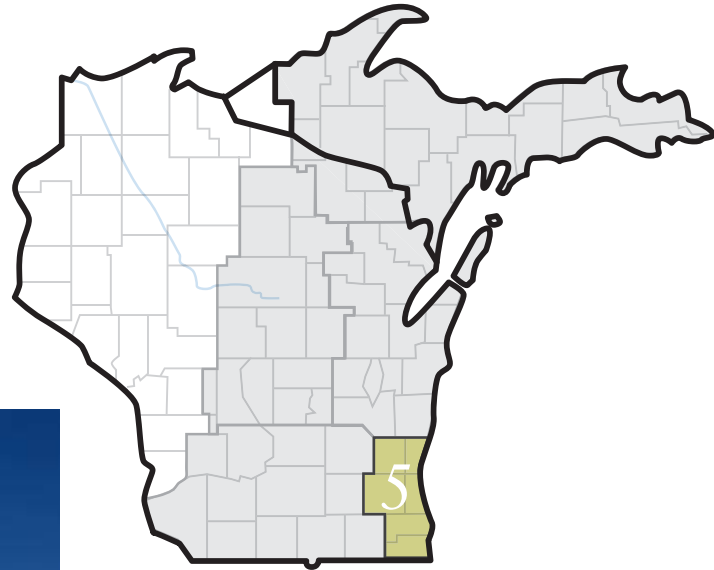


# 10-Year Transmission System Assessment

## Proposals to ensure

- Electric system reliability
- Access to low-cost sources of power
- Access to renewable energy

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## Zone 5 Southeast Wisconsin

KENOSHA  
MILWAUKEE  
OZAUKEE  
RACINE  
WASHINGTON  
WAUKESHA

# Planning for future reliability

American Transmission Co. was formed in 2001 to plan, permit, build, own, operate and maintain a high-voltage electric grid that meets the reliability and economic needs of our customers. Our planners continually conduct engineering studies on the electric transmission system looking for potential problems that may affect the future performance of the system. Our studies identify and prioritize future projects needed to improve the adequacy and reliability of the electric transmission system and meet evolving public priorities for increased availability of renewable generation.

Many projects serve to increase customer access to low-cost generation, which can reduce the cost of serving load in our footprint. In certain cases, expected economic benefits may be the primary driver of a project. Such is the case with our Paddock-Rockdale 345-kV line in southern Wisconsin. It is the first of its kind in the Midwest – while the line will enhance reliability, economics drove the decision to build. Local electric utilities will save through improved access to the wholesale electric market, and those savings will be passed on to end-use electric customers.

Whatever the need, we select best-value projects that resolve multiple system issues, and we do so in a transparent, collaborative process. We bring people into the process, engaging stakeholders in transmission discussion. We believe this open collaboration is critical to efficiently and economically meet renewable portfolio standards in the region. To that end, we are leading and participating in about a dozen regional and intra-regional studies and initiatives. We also are continuing to work with stakeholders in identifying projects that provide economic

benefits and upgrades that could improve access to lower-cost sources of power inside and outside our service territory.

In this, our ninth year of producing a 10-year forecast of transmission system needs, our focus remains on maintaining the adequacy and reliability of the system to meet the current and future needs of our customers. However, this is the first year that we have included asset renewal projects in the Assessment. While our reliability performance data indicates that our system is performing well, we are placing increased emphasis on managing the risk of aging infrastructure. Our approach to work that traditionally has been called maintenance is moving from a time-based program to a more-efficient process that is informed by performance analysis and operational experience.

The 2009 Assessment covers the years 2010 to 2019, and identifies \$2.5 billion in necessary transmission system improvements. The total includes \$1 billion for transmission network upgrades specifically described in this report, along with \$1.5 billion in interconnection and asset renewal projects, infrastructure replacements and relocations, and other smaller network reliability improvements.

While the cost estimate in our 2009 Assessment is slightly less than the \$2.7 billion identified in last year's report, we may increase our overall 10-year capital spending because of increased focus on regional transmission support to move renewable generation to areas where the power is needed. With more than \$2.1 billion invested in the system since 2001, we have become a recognized, national leader in planning, permitting and building electric transmission infrastructure.

Cost estimate of system improvements					
	2005	2006	2007	2008	2009
Total 10-Year Capital Cost	\$3.4B	\$3.1B	\$2.8B	\$2.7B	<b>\$2.5B</b>



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businesses running and communities strong™



# Southeast Wisconsin – Zone 5

## Electric System Overview

### Small increases expected in population, employment

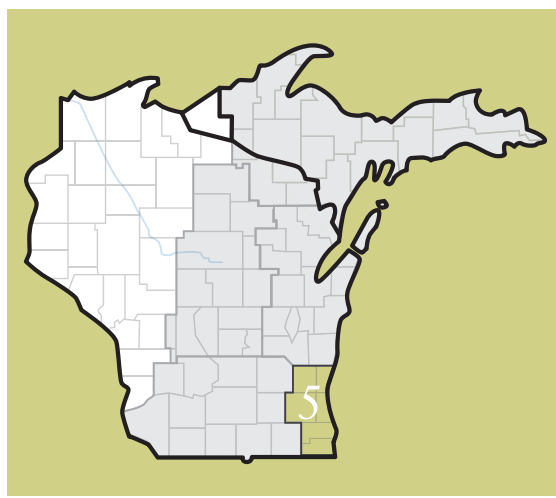
Population in Zone 5 is projected to grow 0.5 percent annually between now and 2019, and employment is projected to grow 0.9 percent in the same time period.

Waukesha County is projected to realize the largest increase in both population and employment.

### Electricity usage growing

Peak electric demand typically occurs during the summer months. Large industrial loads in the Milwaukee metropolitan area, including Charter Steel and Miller Brewing, are among the largest electricity users in the zone.

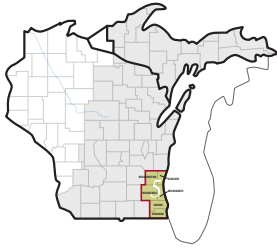
Electric load is projected to grow approximately 1.7 percent annually through 2019.



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## Transmission is the vital link in bringing power to communities

Transmission lines move electricity at high voltages over long distances – from power plants to communities where local utilities deliver power to homes and businesses via distribution lines. A reliable transmission network provides access to many sources of power, whether they are local or regional. Having multiple paths to get power from producers to consumers lessens the chance that they will experience service interruptions. With an increasing emphasis on renewable energy, transmission system planning will become even more important to put the power of wind on the wires.



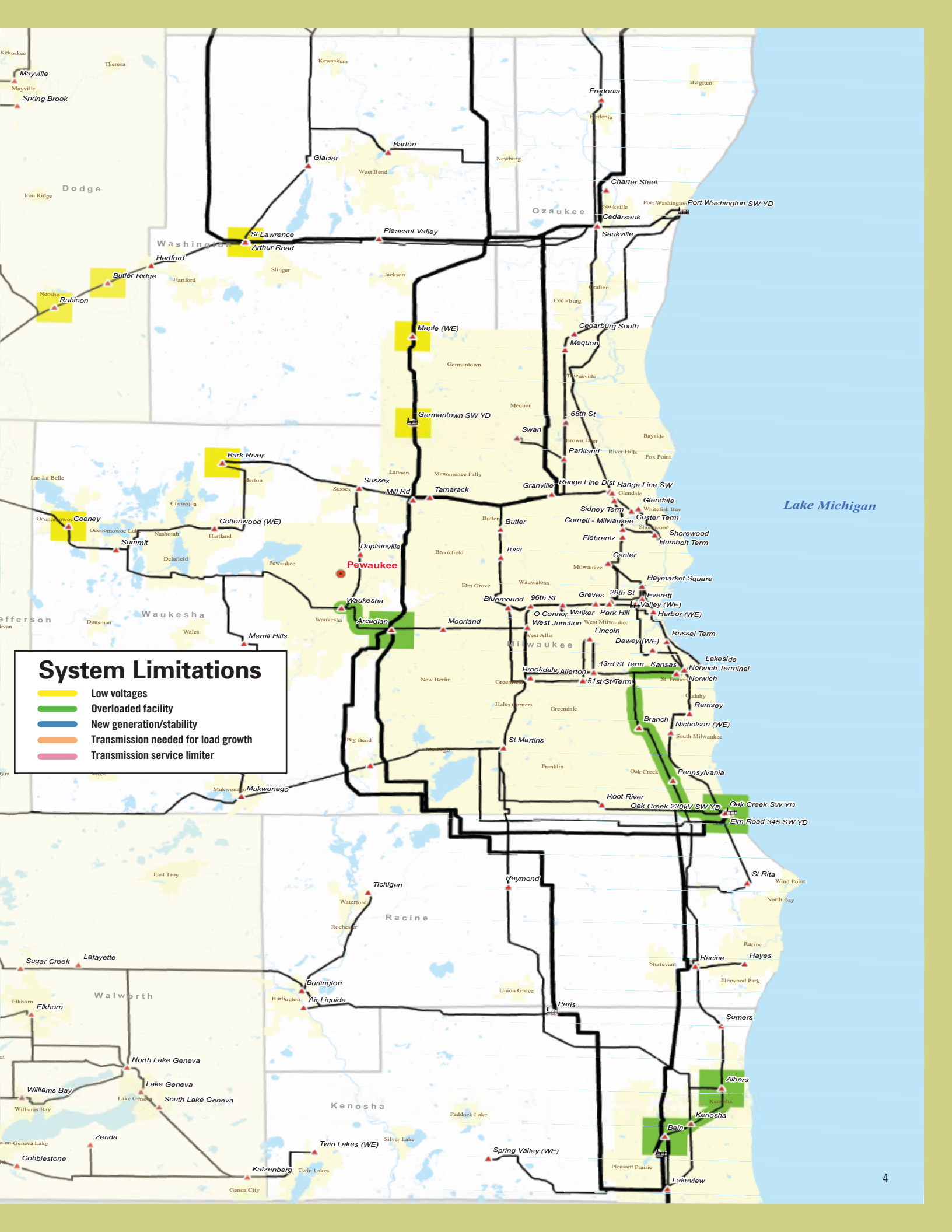
## ***System Limitations*** **Southeast Wisconsin – Zone 5**

### **Transmission system characteristics in Zone 5**

ATC delivers power in Zone 5 with various transmission facilities including:

- north-south 345-kV lines extending from the Edgewater, Point Beach and Sheboygan Energy Center power plants,
- 345-kV lines from Pleasant Prairie Power Plant,
- 345-kV, 230-kV and 138-kV lines from Oak Creek Power Plant and
- numerous 138-kV lines in and around the metro Milwaukee area.

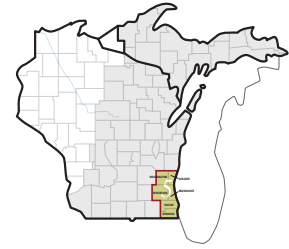
Transmission system reinforcements needed to interconnect and deliver new generation at the Oak Creek Power Plant comprise much of the recent expansion in Zone 5. Significant load growth in Waukesha and Washington counties is projected to exceed the capabilities of the existing 138-kV system in those areas, signaling the need for transmission system reinforcements.



### System Limitations

- Low voltages
- Overloaded facility
- New generation/stability
- Transmission needed for load growth
- Transmission service limiter

# Transmission projects in Zone 5 Southeast Wisconsin – Zone 5



Our current plans in Zone 5 include more than 10 system reliability and economic projects between 2009 and 2023. These projects are in various stages of development. The most notable planned, provisional and asset renewal projects in Zone 5, along with their projected year of completion and the factors driving the need for the projects, are listed below.

	Project description	In-service year	Need driver
	<b>Planned projects</b>		
1	Expand 345/230/138-kV substation at Oak Creek	2010	Accommodates new generation at Oak Creek Power Plant
	<b>Provisional projects</b>		
2	Replace two existing 345/138-kV transformers at Arcadian Substation with one 500-MVA transformer	2013	Relieves thermal overloads under contingency conditions
3	Spring Valley-Twin Lakes-South Lake Geneva 138-kV line	2018	Addresses overloads and low voltages
	<b>Asset Renewal projects</b>		
4	Replace Bluemound 230/138-kV transformers #1 and #3	2011-2012	Increase reliability performance of existing equipment
5	Edgewood-St. Martins 138-kV line rebuild	2014	Improve condition and increase reliability performance of existing line
6	Mukwonago-Edgewood 138-kV line rebuild	2014	Improve condition and increase reliability performance of existing line
7	Concord-Cooney 138-kV line rebuild	2014	Improve condition and increase reliability performance of existing line
8	Paris-Albers 138-kV line rebuild	2014	Improve condition and increase reliability performance of existing line
9	St. Lawrence-Hartford 138-kV line rebuild	2014	Improve condition and increase reliability performance of existing line
10	Waukesha-Summit 138-kV line rebuild	2015	Improve condition and increase reliability performance of existing line
11	Merrill Hills-Summit 138-kV line rebuild	2017	Improve condition and increase reliability performance of existing line

## System Solutions

### SUBSTATION KEY

- SS** **New substation**  
Supports transmission system expansion
- SM** **Substation modifications**  
Upgrades equipment ratings to avert facility overloads
- T** **Transformer**  
Supports local growth and improves voltage levels
- C** **Capacitor bank**  
Relieves low voltages
- T-D** **T-D interconnection**  
Supports local growth

### TRANSMISSION LINE KEY

- **345-kV transmission line**
- ▬ **115-, 138- or 161-kV transmission line**
- ▬▬▬ **Rebuilt 115- or 138-kV transmission line**
- ▬▬▬ **Transmission line voltage conversion**
- ▬▬▬ **69-kV transmission line**
- ▬▬▬ **Rebuilt 69-kV transmission line**





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## ATC AT A GLANCE

- Formed in 2001 as the first multi-state, **transmission-only utility**.
- Owner and operator of approximately **9,400 miles of transmission line and 510 substations**.
- Meeting electric needs of more than **five million people** in 72 counties in four states: Wisconsin, Michigan, Minnesota and Illinois.
- \$2.5 billion** in total assets.

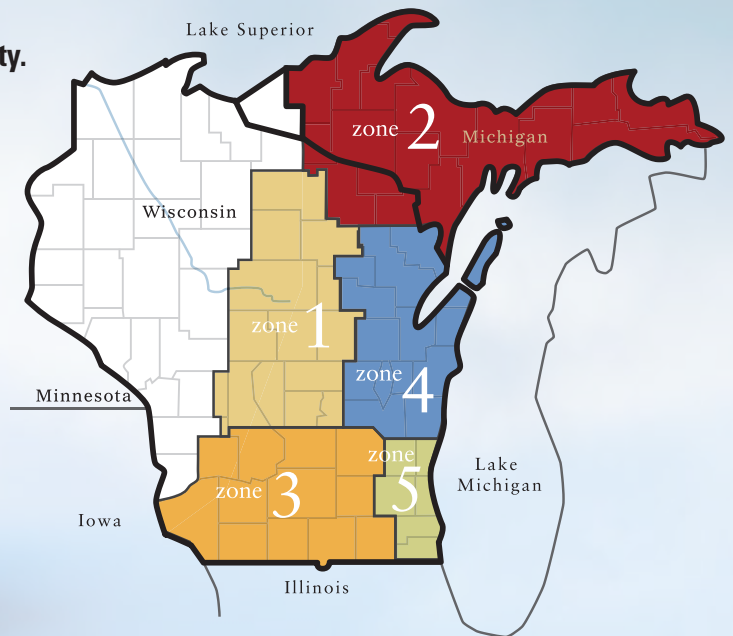
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**Would you like a speaker from ATC to address your group? Give us a call, toll-free, at 1.866.899.3204, ext. 6922.**